IN THE CLAIMS:

1.   (CURRENTLY AMENDED) A method by which a pick and place machine visualizes a part having metallic objects against a non-metallic background comprising:

illuminating the part with electromagnetic radiation is polarized linearly in a predetermined first direction, and

forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction;

whereby in the formed image, contrast between the metallic objects and the background is produced.

2.   (ORIGINAL) The method as claimed in Claim 1, further comprising recognizing the metallic objects in the formed image.

3.   (ORIGINAL) The method as claimed in Claim 1, wherein the electromagnetic radiation is light, and the image is formed by a camera.

4.   (ORIGINAL) The method as claimed in Claim 2, wherein the electromagnetic radiation is light, the image is formed by a camera of a computer vision system, and said recognizing is performed by the computer vision system.

5.   (PREVIOUSLY AMENDED) The method as claimed in Claim 1, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

6.   (PREVIOUSLY AMENDED) The method as claimed in Claim 2, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

7.   (PREVIOUSLY AMENDED) Apparatus for visualization of a part having metallic objects against a non-metallic background as part of a surface mount tool comprising:

one or more sources for illuminating the part with electromagnetic radiation that is linearly polarized, at least one of the sources producing electromagnetic radiation that is linearly polarized in a predetermined first direction, and

an image forming device for forming an image of electromagnetic radiation reflected from the part viewed through a linear polarization filter oriented for passing electromagnetic radiation that is linearly polarized in a second direction that is substantially orthogonal to the first direction,

whereby in the formed image, contrast between the metallic objects and the background is produced.

8.   (ORIGINAL) The apparatus as claimed in Claim 7, further comprising a computer vision system for recognizing the metallic objects in the formed image.

9.   (ORIGINAL) The apparatus as claimed in Claim 7, wherein the electromagnetic radiation is light, and the image forming device is a camera.

10.   (ORIGINAL) The apparatus as claimed in Claim 8, wherein the electromagnetic radiation is light, and the image forming device is a camera of the computer vision system.

11.   (PREVIOUSLY AMENDED) The apparatus as claimed in Claim 7, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

12.   (PREVIOUSLY AMENDED) The apparatus as claimed in Claim 8, wherein the part is a ball grid array, the background is dielectric, and the metallic objects are balls arranged in an array carried by the dielectric.

13.   (ORIGINAL) The apparatus as claimed in Claim 8, further comprising a manipulator for positioning the part on a circuit board or card with recognized metallic objects of the part in registration with contact pads of the board or card.

14.   (ORIGINAL) The- apparatus as claimed in Claim 12, further comprising a manipulator for positioning the ball grid array on a circuit board or card with recognized balls of the ball grid array in registration with contact pads of the board or card.

15.   (PREVIOUSLY AMENDED) The method of Claim 2, further comprising the step of mounting a part recognized on a circuit board in registration with contact pads of the board or card.

16.   (PREVIOUSLY AMENDED) The method of Claim 6, further comprising the step of surface mounting said recognized part in registration with contact pads of a circuit board or card.

17.   (CURRENTLY AMENDED) A pick and place machine that utilizes an automated visualization system to inspect and place surface mount components on a work surface, comprising:

(a)   a manipulator operable to select a surface mount component from a source of said surface mount components;

(b) a visualization system wherein said manipulator is operable to position said surface mount component relative to said visualization system, wherein said visualization system further comprises:

(i) a means for illuminating said surface mount component with electromagnetic radiation polarized in a first direction;

(ii) an optical filter that passes electromagnetic radiation scattered by said surface mount component and linearly polarized in a second direction that is substantially orthogonal to said first direction; and

(iii) a means for imaging said electromagnetic radiation passed by said filter; and

(c) a control system operable to recognize said surface mount component based on imaged electromagnetic radiation passed by said filter, wherein said control system directs said manipulator to place said surface mount component in a predetermined location on said work surface upon recognizing said surface mount component.

18. (PREVIOUSLY ADDED) The pick and place machine of Claim 17, wherein said control system inspects said surface mount component prior to placing said surface mount component in said predetermined location, and wherein if said surface mount component fails inspection said surface mount component is rejected.

19. (PREVIOUSLY ADDED) The pick and place machine of Claim 17, wherein said work surface is a circuit board.

20. (CURRENTLY AMENDED) The pick and place machine of Claim 17, wherein said electromagnetic radiation is linearly or circularly polarized.